1. (Amended) An image processing apparatus, comprising:

transformation means for transforming data space of an input image to discrete multi-resolution space and outputting a discrete multi-resolution representation of the input image;

detecting means for detecting a singularity in the input image;

extracting means for extracting a local pattern in the neighborhood of each coordinate of the discrete multi-resolution representation of the input image, with regard to each of a plurality of depths;

quantizing means for creating a quantization code book based upon the extracted local pattern and replacing each local pattern of respective depths of said discrete multi-resolution representation by a code word using the code book; and

encoding means for algebraic encoding data which includes position coordinates of the singularity in the input image and the code word provided by said quantizing means.

2. (Not Amended From Previous Version) The apparatus according to claim 1, further comprising counting means for counting frequency of occurrence of said local pattern, wherein said quantizing means creates a code book based upon results of counting performed by said counting means.

3. (Not Amended From Previous Version) The apparatus according to claim 2, further comprising structuring means for detecting an inclusion relation of any two representative vectors that have been registered in said code book, and structuring said code book.

4. (Not Amended From Previous Version) The apparatus according to claim 3, further comprising:

memory means for storing degree of conformity or quantization error, calculated by said quantizing means, when the local pattern is allocated to a representative vector; and

deciding means which, on the basis of the degree of conformity or quantization error, is for deciding the order relating to the perspective depth between any two representative vectors contained in the code data;

wherein said encoding means encodes the order relating to the perspective depth.

5. (Not Amended From Previous Version) An image processing apparatus comprising the image processing apparatus described in claim 4, wherein said image processing apparatus is applied to image recognition to retrieve image data from a partial image.

6. (Not Amended From Previous Version) An image processing apparatus comprising:

decoding means for decoding a code generated by the image processing apparatus described in claim 4;

inverse quantizing means for generating a local pattern from a code word contained in code data decoded by said decoding means; and

synthesizing means for combining a plurality of local patterns, which have been generated by said inverse quantizing means, based upon position coordinates of a singularity decoded by said decoding means, and order information relating to depth of a plurality of representative vectors.

7. (Not Amended From Previous Version) The apparatus according to claim 6, further comprising memory means for storing code data and outputting the code data stored in said memory means to said decoding means.

8. (Amended) An image processing method, comprising the steps of:

transforming data space of an input image to discrete multi-resolution space and outputting a discrete multi-resolution representation of the input image;

detecting a singularity in the input image;

extracting a local pattern in the neighborhood of each coordinate of said discrete multi-resolution representation of the input image, with regard to each of a plurality of depths;

creating a quantization code book based upon the extracted local pattern and replacing each local pattern of respective depths of said discrete multi-resolution representation by a code word using the code book; and

algebraically encoding data which includes position coordinates of the singularity in the input image and the code word obtained in said creating step.

9. (Amended) The method according to claim 8, further comprising a step of counting frequency of occurrence of said local pattern, wherein said creating step creates a code book based upon results of counting obtained in said counting step.

10. (Amended) The method according to claim 9, further comprising a step of detecting an inclusion relation of any two representative vectors that have been registered in said code book, and structuring said code book.

11. (Amended) The method according to claim 9, further comprising the steps of:

calculating, in said creating step, degree of conformity or quantization error when the local pattern is allocated to a representative vector; and

deciding the order relating to the perspective depth between any two representative vectors contained in the code data based on the degree of conformity or quantization error,

wherein said encoding step encodes the order relating to the perspective depth.